# GARDEN AND FOREST.

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## School-grounds.

A VALUED correspondent writes to inquire why we have not more persistently advocated the systematic planting of school-grounds, both for purposes of decoration and instruction. He argues with reason that the place where children pass a large portion of their waking hours during the formative period of their lives ought to be one that will exert a refining influence, whereas in very many instances the school-house and its surroundings, both in country and city, are comfortless, and even repulsive. After adding that a well-selected collection of trees and shrubs and herbaceous plants could be used to great advantage in furnishing object-lessons for the study of botany and for instruction in the elements of practical horticulture, and even of forestry, he inquires why it would not be practicable for us to publish some plans for the laying out of school-grounds so as to give them an educational value in this direction, besides encouraging an intelligent love of what is most beautiful in nature.

We have discussed this subject more than once, and realize its importance, but we are convinced that ready-made plans are rarely helpful to ordinary readers, because the sketches of places usually published give altogether erroneous ideas of the actual appearance of these places when the plans are carried out. More than that, as we have often said, each place has individual characteristics of boundary and surface and outlook, and it must, therefore, be studied by itself. As a rule, about the worst possible design for the development of the grounds about any school-building is one that has been prepared originally for some other place.

Not far from the bank of a river in Pennsylvania we once saw a low stone schoolhouse situated nearly in the centre of a sloping lot of some five acres, about which were scattered broad-spreading Oaks far enough apart as to leave sunny spaces between them, except one group of three trees and a little grove at one of the upper corners. There was no town in sight, and one could hardly imagine a more tranquil place. Certainly it would have been an offense against good taste to import some novelty out of a map to belittle the grandeur of the Oaks, or to add any shrubs or flowers to such a picture. Even for educational purposes one would regret to see the dignity of such a spot marred by the intrusion of a shrub-border or a flower-bed. There was an abundance of good land all about the enclosure, and in this case it would have been preferable to arrange for object-lessons in horticulture and botany outside of this picture of peace. Too often, however, the schoolhouse stands on the public highway with scarcely any playground but the mud and dust of the road, and no sign of a shade-tree. For such a desolate place there is absolutely no excuse. Of course, there should be an enclosed playground connected with every school, both in the country and city. In the country, at least, it would cost but a trifle to add to the playground proper a neatly grassed area, with a bordering shrubbery and some well-kept shade-trees. Where the playground is thus separated from what may be called the garden the usefulness of the latter will largely depend upon the interest taken in it by the children. We have recorded instances where the pupils of schools, having been invited to help in the planting and care of school-grounds, came to cherish them with a real affection which has survived until long after their entrance into active life. The conduct of school boys, as well as of their elders, is largely controlled by traditions, and it has been proved over and over again that a feeling of local pride can be engendered which persists through successive generations of children, and insures such a regard for a place that there is little fear of any attempt at its wanton defacement. If prizes were offered in every county for the most tastefully planted and carefully maintained school-grounds, the spirit of emulation could be effectively added as another incentive to beautify and protect them.

In crowded cities, where the pupils in every school-building are counted by hundreds, it will hardly be possible, as a rule, to have school-grounds sufficiently spacious to furnish at once an outdoor gymnasium and a pleasure-garden. There are few places so contracted, however, that they will not admit of some planting along the walls, where vines and flowering herbs can be made to flourish. Window plants, at least, can be introduced into the school-room, to cheer and brighten what too often is a bare and forbidding apartment, and to furnish object-lessons for elementary instruction in horticulture and botany. But in the country there are few places where it is not possible to have a real garden, with carefully labeled plants and shrubs and trees—a garden for which children can be made to feel a sense of responsibility, and in which they will take an active interest. If they are called to assist in caring for and cultivating the plants, they will be able to gain in a delightful way many lessons in cleanliness and order as well as in natural science, and they will acquire the habit of observing closely beauties of structure and adaptation in every form of vegetation, a habit which will bring increasing delight and refreshment to its possessors all through their lives.

The sum of the matter is that the expenditure of a few dollars and a little careful thought in furnishing the school-building and planting shrubs and native trees about it will transform the house and grounds from an appearance of discomfort and squalor to one of cheerfulness and beauty. But this planting will do more than exert a softening and civilizing influence upon school children. It is well known that school gardens play an important part in the educational system of many countries, and certainly practical instruction in this direction is needed in the United States, if it is needed anywhere. If a few of our native trees and shrubs were planted in the grounds of every district school, and teachers took pains to call attention to their names and characters and modes of growth, there would not be as many men and women in the country as there are now who cannot distinguish our commonest species of Oaks or Maples or Hickories. No extensive arboretum will be needed for such study. With a few trees for illustration and comparison it will not

be difficult to arouse an interest which will lead the student of nature to the neighboring woods and roadsides for additional knowledge of our trees and their uses, their histories, their relationships and distribution. In a recent address by the Secretary of the Minnesota State Forestry Association, it is justly contended that the foundation for systematic forestry is best laid in the school-house lot, for if we are ever to have a stable forest-practice throughout the country it must rest on the general knowledge of trees and their importance to the whole community. This knowledge ought to begin in the primary schools. The youngest school boy is old enough to find the study of the school-garden the most absorbing of all his occupations.

## The Shrubbery in December.

SHRUBS with brilliantly colored bark or with persistent bright fruit appear to the greatest advantage in these clear, cold December days, and make parks and shrubberies where such plants are skillfully massed exceedingly interesting. In our country they should be more largely employed than any one has yet used them, because during several weeks after the leaves have fallen from most trees and shrubs we have here delightful, sunny, crisp days, when it is a pleasure to be out-of-doors, and parks should be made as beautiful as at any other season of the year.

The shrubs whose bark is now the most brilliant are the red-stem Dogwoods, principally the North American Cornus sericea and Cornus stolonifera, and the Old World Cornus alba and its Siberian variety, the Japanese Kerria, with its bright yellow-green, slender, graceful stems, and several of the yellow-stemmed shrubby Willows. Massed together these plants now make a handsome and agreeable combination of color.

Of fruits borne by shrubs none is now so brilliant as that of the Japanese Berberis Thunbergii, which is loaded with its bright scarlet berries; and these retain their freshness and beauty until after the leaves appear in May. It is interesting to note that as quails are particularly fond of these berries, Berberis Thunbergii can be planted with advantage where it is desirable to furnish these birds with winter food. Every year makes the value of this excellent shrub appear greater, and the ease with which it can be raised from seed, and its hardiness, which enables it to flourish as far north, at least, as Ottawa, in the Province of Quebec, make it possible to cultivate it on a very large scale, and to place it within the reach of every one. Other shrubs which are just now conspicuous with brilliant scarlet fruit are the native Black Alders, Ilex verticillata and Ilex lævigata. Of these the latter, although the more beautiful of the two plants, is comparatively rare and very little known, except by botanists.

Some of the American Thorns can well be used where it is desirable to produce winter effects with deciduous-leaved trees. The scarlet fruit of the Washington Thorn, Cratægus cordata, is just now beautiful; it is not large, but very lustrous, and it retains its freshness quite late into the winter. At all seasons of the year this is a desirable little tree, and it is hardy and grows rapidly. The flowers appear in the early summer, after those of the other Hawthorns are gone, and its shining nearly triangular leaves turn late in the autumn to bright shades of orange and scarlet. It is probably most beautiful early in November, for the color of the fruit is heightened then by that of the foliage, the two blending and harmonizing perfectly. The fruit of the Cockspur Thorn, Cratægus Crus-galli, is now at its best, and often quite covers the branches from which the leaves have all disappeared. The fruit of this species is much larger than that of the Washington Thorn, but it is dull, and red, rather than scarlet, in color. But the most showy fruit of any of the Thorns at this season of the year is that of Cratægus Carrieri, a probable hybrid of which some account is given in another column of this issue.

This list includes but a few of the shrubs whose bright colors delight the eye in early winter. These ornamental fruits persist on some of them all winter, and there is a delicacy of tint in the branchlets of a shrubbery which is never as charming as when the ground is covered with snow. One who knows trees and shrubs only when they are in leaf and flower knows only half their beauty.

## The Heaths among the Pines in Early Winter.

THE attractiveness of the Pines in winter is largely due to the Heath family, which is the best represented order of woody plants in our region. One of the chief charms of the deciduous members of the order is in the diversified forms and colors of the denuded branches and twigs. The soft and downy young shoots of the Stagger Bush, Andromeda Marianna, are reddish brown, and below them, on last year's growth, are snuggled the scaly buds which, in spring, will open into delicate clusters of white waxy flowers. A. ligustrina, though not as handsome as A. Marianna, is, nevertheless, quite interesting now and at any time during the winter. This species also has its flower-buds in clusters on the branchlets of last year.

The two species of Leucothoë in the Pines are both deciduous. L. racemosa is tall, compact, straight and clean-limbed, and all the new growth is a deep red color. L. recurva is much lower and more straggling. The flower-buds, formed during summer, are arranged along the stems of this year's growth in both species; they terminate the branches in long racemes, and some of the buds now look almost ready to expand, but they will not unfold, however warm it may be, until spring. The three species of Gaylussacias, familiar here, are also interesting studies now. The little creeping G. dumosa is still holding its leaves, but there is no difficulty in finding the numerous scaly buds which inclose next season's racemes of handsome flowers. The taller shrub, G. frondosa, has slender upright gray branches now bare of leaves. From the scaly, conspicuous buds next spring will burst drooping slender pedicels of reddish bell-shaped flowers, followed by sweet, edible berries which are often found in markets under the general name of huckleberries. Less tall than G. frondosa is the more straggling G. resinosa. The leaves are gone from this species, too, but the numerous clustered buds promise abundant flowers, and later the shining black edible fruit.

The Vacciniums, or true Huckleberries, are well represented in the Pines. V. Pennsylvanica is a dwarf straggling bush, growing in dry sandy places. The large, scaly flower-buds are easily recognized from the leaf-buds. The flowers open a little before the leaves appear, and are followed by large, sweet, delicious fruit, ripe by the last of June and early July. The numerous fine seeds of the fruits of the Vacciniums are not objectionable as are the ten large, long seeds of the Gaylussacias. In similarly dry sandy tracts grows the low shrub, V. vacillans; its fruit ripens later and is less luscious than that of V. Pennsylvanica. Both species have green branches throughout the winter. In the damp Pines the Swamp Huckleberry, V. corymbosum, and its numerous forms are abundant, the bushes of the different varieties being of various sizes. The branches show a wide range of color, some having a purplish tinge in winter, others red and yellowish-green. There is even greater diversity in the form of the flowers and fruit; some bushes bear broad flat berries, while others have nearly round fruit, and still others pyriform. While the quality of all is good, that of the large flat ones is the best.

But no plant among the Heaths is more attractive in winter than Rhododendron viscosum, the white Swamp Honeysuckle. The large terminal scaly flower-buds are variously tinted, as are also the twigs and branches and leaf-buds. In striking contrast is Clethra, which grows by its side. This shrub is almost wholly a dull gray color, nearly all the branches and twigs being surrounded with dry gray seed-pods. The evergreen members of the family are always interesting. The thick, shining leaves of the broad-leaved Kalmia and the varied color of the branchlets which

hold the leaves are a charming feature of the Pines. The low Laurel helps to give the damp places a fresh green look all winter long. Another attractive little plant at this time is Cassandra. The flower-bud carried in the axil of each small green leaf even now shows the white tips of the corolla reaching out beyond the rigid sepals. Another small denizen of the Pines, the Sand Myrtle, Leiophyllum, bears numerous tiny shining leaves; on some plants these have a purple tinge, while on others they are bright green. The scaly flower-buds terminate the branches, from which in May fine clusters of small white flowers will appear, bearing purple exserted stamens. The creeping evergreen members of the family also claim admiration in winter. The white and pink tips of the Trailing Arbutus are already peeping out from the clusters of scaly bracts, and the bright scarlet spicy berries of the Creeping Wintergreen are conspicuous among its handsome aromatic foliage. Especially handsome are the thick evergreen leaves of the Chimaphilas, or Prince's Pine, especially those of C. maculata, with white variegation on the upper surface. The Pyrolas are almost always near neighbors to the Chimaphilas, especially some of the forms of P. rotundifolia. Both the Chimaphilas and Pyrolas are still holding their old flower-scapes, with dry seed-pods standing well above the shining leaves.

But the Heath family is not the only attraction in the Pines at this time. The younger plants and shoots of Magnolia glauca are holding their large glossy leaves, and the silky leaf-buds, with their sheathing wrappings one above the other, make the plant more interesting now than it is in summer. By the side of Magnolia the dark gray twigs of the Bayberry are thickly scattered over with small red buds, and each branchlet is surmounted with a cluster of fragrant leaves which will remain until spring. Small downy buds are ranged along the stems of the Sweet Fern, and most of the twigs are terminated with a raceme of embryonic catkins, which will gradually grow in length each pleasant day. The sweet-scented leaves have mostly fallen, but the plant has an agreeable perfume all winter.

One of the most interesting plants for winter study is the Alder, Alnus rugosa. The branches are a metallic-gray, terminated with clusters of sterile catkins, which are now reddish brown and about an inch in length. The fertile clusters are the same color, but much smaller, and below the sterile ones. Both kinds are destitute of wrappings, while the gray leaf-buds have scaly coverings. During a warm spell in winter the catkins visibly elongate, sometimes in a few hours, often to be speedily checked by sudden cold. The old fertile catkins help to decorate the plant all winter; they resemble clusters of small cones and are filled with seeds, which readily scatter with handling. The Fringe-tree is a uniform gray, the new growth in no way differing from the old, and the buds are scarcely perceptible at this time, but by February there will be a marked change in their appearance. Four species of Ilex help to enliven the Pines; the well-known Holly and Inkberry are evergreen, while the Winterberries, I. verticillata and I. lævigata, lose their foliage, but hold the bright red berries all winter.

Situated near large cities as we are, our Pines begin to show the devastating effects produced by the demand for Christmas green each year. The Mistletoe has almost entirely disappeared, and the Holly is fast following in its wake. Last year even my garden was invaded, and three Hollies full of fruit were almost entirely ruined by vandals, who with axes hacked off branches as high as they could reach. A reward for their apprehension failed to bring the culprits to justice.

Vineland, N. J. *Mary Treat.*

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How clean and hardy and wholesome is the Shrub Oak now, tenacious of its leaves, which shrivel not but retain a certain wintry life, not wrinkled and thin, like those of the White Oak, but full-veined and plump, sun-tanned above to the fast color that Nature loves, the color of the deer and of the cow, and silver-downy beneath towards the russet fields.—*Thoreau.*

## Notes on the Flora of a Prairie State.

### I.—THE DIAMOND WILLOW IN SOUTH DAKOTA.

PERHAPS the most characteristic woody plant of the region drained by the upper Missouri is the so-called Diamond Willow. The peculiar clumps of this Willow, Salix cordata, make one of the most prominent features of the vegetation along the watercourses of the region. They may be seen standing at the water's edge, forming a striking fringe to the winding stream, or along the margins of the moister sloughs and the bayous of the low bottoms, and these bayous are usually formed by the changes which take place in the course of the bed of the stream.

This Willow always grows in these characteristic clumps, which are formed by the development of sprouts from the original plant. In the larger clumps the first or oldest stem is usually dead or dying, and the gradual formation of the group of stems can be traced in the successive growth of new shoots which has plainly taken place. The main stem may reach a diameter at the base of from three to eight, or rarely twelve or fourteen, inches before dying. The height attained may vary from ten to thirty feet, depending largely upon the conditions under which the plant has developed. These clumps may consist of from three or four to several hundred stems each.

The bark of the young growing plants is gray and quite smooth at first, becoming more or less broken and darker in color as the stems become older. The young twigs may be either smooth or pubescent. The sapwood is white, and in the older plants is quite thin as compared with the heart-wood, which is firm, of a reddish color and very durable. The settlers regard it as very valuable for fuel, stakes, rails, etc. Posts made from it are said to be as lasting as those from Red Cedar. In eastern Nebraska and western Iowa this Willow has been quite highly prized for use as stakes in rail fences. I have known stakes and rails to be in constant use for over twenty years.

Many theories have been advanced to explain the origin of the so-called diamonds which form on the stem. It seems quite likely that their origin is mainly physiological, and that their formation is influenced largely by certain physical conditions or phenomena. When the shoot is growing rapidly and is not too badly crowded, few or no diamonds are formed; but when growth is less vigorous and the branches get too thick and begin to die off, crowded out by their stronger neighbors, the formation of the diamonds begins. While these markings vary greatly in size and shape, the general outline is that of an ellipse, pointed at each end, with the branch in the middle and the long diameter parallel with the axis of the stem of the plant.

The best explanation of the formation of these diamonds seems to be that when a twig dies the combium tissue also dies for some distance about its base; a mass of firm, protective tissue is formed at the edge of this area, and each season, as the stem grows, instead of healing over the wound, the growing tissue is forced back further and further and the diamond keeps increasing in size. The bark usually adheres very closely to the wood over the dead area and thus helps to prevent the tissues from growing over the wound. It seems that certain insects may aid in the formation of these markings by killing the branches or boring into the wood about their bases. The diamonds are always more numerous on a slow-growing stem than on one that has been thrifty and of rapid growth. It is not unlikely that the rigorous climate of the upper Missouri valley has something to do with these peculiar deformities.

The excessive development of these areas seen on many of the stems gives them very odd shapes. Sometimes the diamonds may be arranged quite regularly on four sides of a stem, causing it to take on a quadrangular outline; at other times they may be on three, or even two sides; again, they may be scattered irregularly over the entire surface for a considerable distance, and then be almost entirely wanting over a like area. It is not an uncommon thing to find a large stem so flattened in places as to have

a short diameter of but one or two inches, while the long diameter may be many times as great. Perhaps the same stem may be quite regularly cylindrical a few feet above and below this place.

The Diamond Willow occurs more or less plentifully throughout the entire state of South Dakota. Specimens are in the college herbarium from many localities in the Big Stone region, the Sioux Valley, the James Valley, the Missouri Valley, the Cheyenne Valley and the Black Hills. It is particularly abundant in the valleys of the Sioux and the Missouri rivers.

In eastern Nebraska, where this Willow is also quite common, it is often called Red Willow. It does not form diamonds so abundantly here as it does in Dakota.

State Agricul. College, Brookings, Neb. *Thomas A. Williams.*

## The Papaw, Asimina triloba.

THE papaw is one of our native fruits which are comparatively unknown outside the region to which it is indigenous. Horticultural writers have either overlooked it or have known so little of it that they avoid the subject. With the possible exception of Wheeling, West Virginia, and Pittsburg, Pennsylvania, none of our cities ever offer it in their markets. Why this should be it is hard to say, for persons familiar with it, as grown and ripened in our native woods, prize it more highly than any of the tropical fruits sold by city venders. Perhaps this home demand consumes a large percentage of the natural product, and thus keeps it a rarity in the markets.

I believe it is generally supposed that the papaw is peculiarly a southern fruit and that it cannot be grown far north; this is a mistake, however, as its natural distribution is quite well northward, the tree being found indigenous in the province of Ontario. It is also native to sections of New York, Pennsylvania and the states to the southward, and in Massachusetts and New York it has been successfully fruited under cultivation. The specimens produced in Massachusetts are said to be small in comparison to the average size of the same fruit farther south. The tree in its northern home is reported to be perfectly hardy, however, and to have borne fruit since it was ten or twelve years from the seed. At the time the above report was made the tree was thirty-five years of age.

In New Jersey, upon the grounds of Mr. Carman, editor of *The Rural New-Yorker*, this tree has been growing for more than twenty years, the tree having originally been taken from the forest. The most remarkable specimen of this tree under cultivation is presumably one located upon the grounds of Thomas Meehan & Sons, of Philadelphia. These trees are now more than forty feet in height and a foot in diameter. Other large specimens are spoken of in Ohio, but, as usually met with, the Papaw is a large shrub or small tree, leading one to class it among shrubs rather than trees, although it is a tree in every sense of the word, but, unlike many of our fruit-producers, it bears its largest crops, in proportion to its size, when quite young and in a comparatively shrubby form.

The fruits are variable in size, ranging from two to six inches in length and from one to two and a half inches in diameter. The flesh is soft and pulpy, much resembling that of an overripe banana; the rind is thin and adherent, and is generally eaten with the pulp, which is very rich and sweet—rather too sweet upon first acquaintance, but not more so than some bananas. Instead of being seedless, as the tropical fruit, it contains a variable number of large date-like seeds, the Papaw-seed being much larger and more flattened than those of the date. The form of the seeds, as well as their peculiar arrangement in the fruit, is clearly shown in the illustration on page 495. As will be seen in the section of the fruit, the seeds are arranged in a double row, one upon each side of a slight median mark shown on the fruit, and they are set in edgewise in two ranks, except at the ends, where a single seed caps the termination of the rows. In small fruits the two rows of seeds are less clearly marked and an uneven number of seeds is more often found. A fruit three inches long will not infrequently contain seven good-sized seeds.

The surface of the shell of the seed is glossy as though varnished, and in texture is as hard as horn, being quite indestructible in contact with the soil. They have frequently been plowed up in fields where they have lain twenty years or more and apparently as sound at the end of that period as when first buried. It is Nature's method to plant these seeds in the fall, and if we are to be successful in propagating the tree from seeds we must imitate Nature closely and plant them as soon as possible, after removing them from the fruits, or stratify them in the sand and plant the succeeding spring.

The Papaw is said to be a difficult tree to transplant successfully from the forest, nevertheless we know many instances where such removals have proved satisfactory. Like many other plants that have not been domesticated, the Papaw is best transplanted when quite young and small. The methods of propagating this tree deserve attention, for even in the wild plants we find great variations in the size and season of ripening, and if this fruit is to be brought under cultivation, of which it is certainly worthy, we must find simple and practicable methods of perpetuating varieties. At present our only resource is to grow plants from seed or from layers. By the first method we can only expect valuable offspring, while the second method is a slow and unprofitable way of increasing tree-fruits. The art of budding and grafting this plant is, so far as I can learn, unknown.

Besides its value as a fruit-bearing plant, the Papaw occupies no mean place among ornamental species, and in this particular it is more widely known than as a producer of fruit. Its peculiar and attractively colored flower-clusters, appearing before the leaves in the spring, would be a pleasing novelty for the lawn; its large leaves, often a foot in length and four to six inches in width, give it an effect of tropical luxuriance; and after these have fallen the spherical furry buds of a rich brown color contrast very pleasingly with the soft drab of the bark. One can hardly understand why a native plant possessing as many worthy features as this one should have remained so long in the background.

West Virginia Experiment Station. *L. C. Corbett.*

## New or Little-known Plants.

### Philadelphus Falconeri.

UNDER this name there was received at the Arnold Arboretum, in 1881, from the Parsons' Nursery, in Flushing, New York, the plant which is figured on page 497 of this issue. Of its origin nothing is known, and I have not seen it in any European garden or herbarium. It is certainly not an American species, and is, perhaps, only a monstrous form of the widely distributed and variable Philadelphus coronarius of the Himalayas and western Asia. From some Japanese forms of this plant it differs only in its more acute calyx-lobes and in its elongated, narrow petals, which distinguish this plant from all other species of Philadelphus. The fact that about thirty years ago many plants were sent by Hogg and by Hall to the Parsons' Nursery from Japan gives some ground for the belief that Philadelphus Falconeri is of Japanese origin, or that it is a Chinese plant cultivated by the Japanese in their gardens, for it is not now known to Japanese botanists.

Philadelphus Falconeri, a name which is only used provisionally and until something more of the history and origin of this plant can be determined, is a beautiful shrub here, with spreading stems, eight or ten feet tall, and ovate-acute, smooth, glabrous three-nerved leaves furnished above the middle with a few minute remote teeth, and about two and a half inches long. The flowers are fragrant and are borne in few-flowered lax panicles, on elongated slender, glabrous pedicels, and are about an inch long, with ovate-acute

glabrous calyx-lobes rather less than half the length of the narrowly obovate acute white petals. The fruit is not distinguishable from that of Philadelphus coronarius, except in the rather longer calyx-lobes.

Philadelphus Falconeri is a hardy and graceful shrub and one of the most distinct and beautiful members of a genus distinguished for abundant handsome and fragrant flowers. Our illustration, which is made from a plant in the Arnold Arboretum, is published to draw the attention of gardeners to a valuable hardy shrub which is still little known, with the hope that it may lead to some information with regard to its origin.

*C. S. S.*

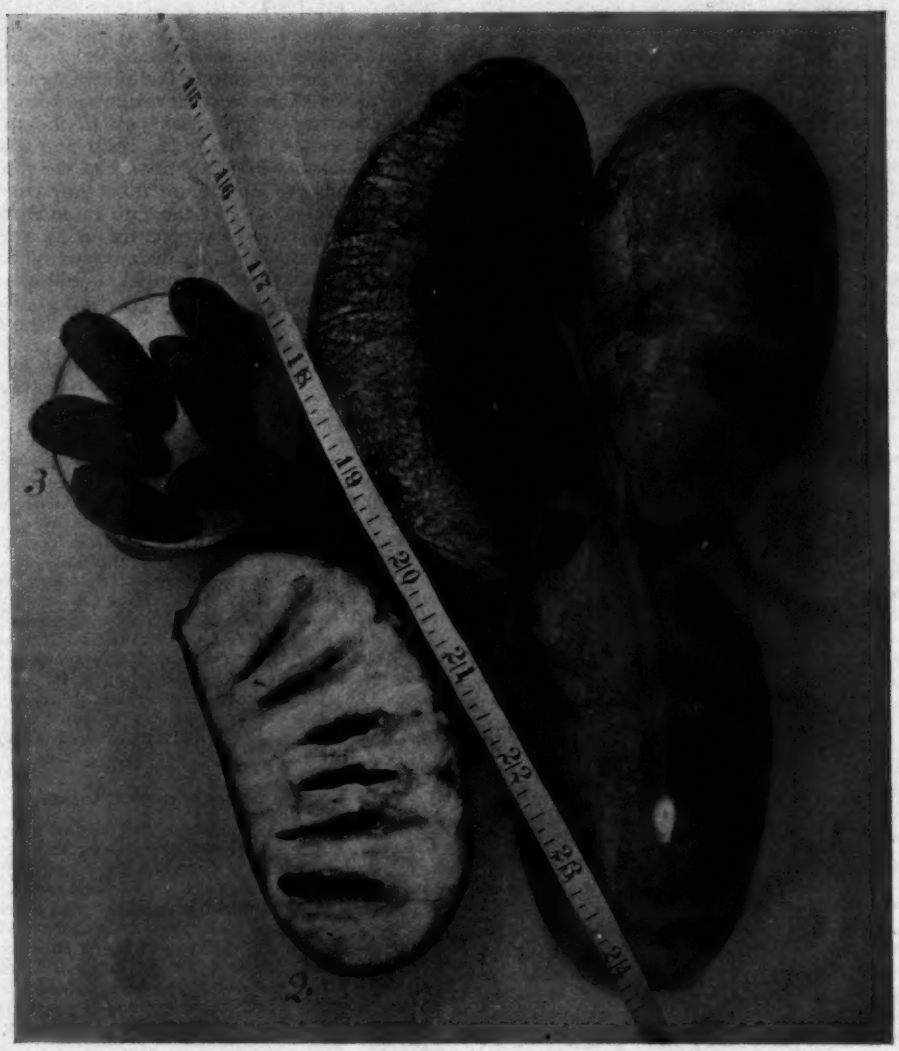

Fig. 67.—1. Fruit of the Papaw, Asimina triloba. 2. Section of fruit. 3. Seeds.—See page 494.

CRATÆGUS CARRIERI.—This Thorn is now well established in the Arnold Arboretum, where it is covered this year with fruit; this is oblong, about three-quarters of an inch long, bright scarlet and very lustrous, hanging on long stems in open few-fruited clusters. This tree originated in the Jardin des Plantes, in Paris, and is said to have been raised from a seed of Cratægus Mexicana which Carrière had planted when he was at the head of the nursery department of that establishment. It was first described by him in 1883 in the *Revue Horticole*, where a beautiful colored plate represents the flowering and fruiting branches. Cratægus Carrieri has generally been considered a form of Cratægus Crus-galli, the winter buds, flowers and leaves resembling those of that species, but the fruit is certainly very distinct in form and color and in the consistency of the flesh, and it is, perhaps, a hybrid in which Cratægus Crus-galli has played an important part, but, whatever its origin or relationship, Cratægus Carrieri is a beautiful hardy little tree, and one of the most desirable of all plants that bear showy winter fruit.

## Plant Notes.

OXYDENDRUM ARBOREUM.—The Sorrel-tree, or Sour-wood, presents a pleasing appearance at this season in regions where it assumes tree-form, from the beauty of its deeply furrowed gray bark and its reddish bronze and orange-colored branchlets. In the northern part of New England, however, it is rarely more than a shrub, although in the southern Alleghany region it is a graceful and slender tree fifty or sixty feet tall. In spring, as they unfold, the shining leaves are a bronzy green; when fully grown they are large, bright green and lustrous, and in the autumn they turn to colors which rival those of the Dogwood and Tupelo. In fact, in the splendor of its autumn foliage it is not excelled by any American tree. Its flowers, which appear in midsummer, are pure white, bell-shaped, a quar-

ter of an inch long, borne in a spreading panicle of one-sided drooping racemes at the end of the leaf-branches of the year, and, from their shape, arrangement and color, the Oxydendrum is often called the Lily-of-the-valley Tree. In autumn, among the glowing foliage, the racemes of yellow fruit add to its general interest. The tree was grown in England as early as the middle of the last century, and yet it is a comparatively rare inhabitant of American gardens, although there is no reason for this neglect. It is easily raised from seed; it is not difficult to transplant and it is hardy as far north as Boston. Its leaves are subject to few injuries by insects or fungi; its flowers appear at a season when few other trees are in bloom; the splendor of its autumn colors is unsurpassed so that there are few of our small trees which better deserve attention. It is often sold in nurseries as Andromeda arborea. Oxydendrum is a monotypic genus, consisting of this single American tree. The generic name was given to the tree on account of the pleasant acid taste of the leaves.

Tecoma Capensis.—This is a useful greenhouse climber, and it is especially valuable because it can be kept low and bushy when this is desirable. It flowers at different seasons of the year, but particularly during late winter and early in spring. The bright color of its flowers renders it particularly attractive at this season when highly colored flowers are scarce. They are produced in clustered racemes from the apex of ripened side-shoots, measuring more than two inches in length, and are of a bright orange-scarlet color, with a more slender tube than those of T. radicans. The foliage is evergreen, but resembles that of our native Trumpet Flower, and a bright shining green in color. This plant should be grown in comparatively small pots, so that the ripening of the flowering branches will be hastened and the plant become sturdy and bushy. It is possible to grow it as a climber, but it is more profitable to shorten all long branches during the growing season, thereby encouraging the formation of flowering side-shoots. The best soil for it is a rich fibrous loam, with an addition of well-rotted manure. During the summer the plants may be placed in the open air with the pots sunk in the ground in an open and sunny position. During this period watering should be carefully attended to, but not overdone. This Tecoma is propagated by cuttings of ripe wood in a sheltered position out-of-doors in summer, or by herbaceous cuttings which root in a few days when placed in bottom-heat and kept moist at any time of the year. For many purposes this is one of our best greenhouse and house plants. The foliage in itself is very pleasing, and when the beautiful flowers appear the effect is highly ornamental. When grown in a house the sunniest window and the most airy apartment is best for the development of its full beauty.

Begonia Saundersii.—None of the shrubby Begonias surpass this species in grace of form. It is tall, with slender stems and obliquely cordate leaves of a deep glossy green on slender petioles an inch long. The flowers are borne in immense cymes on very long and slender peduncles from the axils of the upper leaves. Male and female flowers are produced on separate cymes. The former have six petals, almost obovate in outline, half an inch or more in length; the male flowers have only four petals and are rather smaller. The color is a very bright rose, and the effect of a good specimen in full flower is exceedingly pleasing. It flowers late in summer and continues in bloom during autumn and early winter.

Miltonia Clowesii.—Among the dainty Orchids known as Miltonias, this is, perhaps, the most picturesquely beautiful. It is a tropical Brazilian plant, and should be grown in the warmest section of the Orchid-house in a half-shady position. During the growing season, like all other Miltonias, it requires plenty of water, and it does not resent a little manure-water now and then. It is generally grown in shallow pans or pots in peat and sphagnum, preferably with an addition of charcoal. The flowers are borne on long nodding peduncles in loose racemes. They measure three inches or more across. The petals and sepals are spreading, long, linear or slightly lanceolate, with the edges turned back in the middle; yellow, barred with rich brown, well-marked blotches. The lip is entire, cordate; purple, with a conspicuous white apex. The leaves are long and graceful, produced from ovate, smooth pseudo-bulbs, from the base of which a number of white, thread-like aërial roots add, in their way, to the beauty of the plant. It flowers during the autumn months.

## Cultural Department.

### Irrigation in New England.

UNCOMMONLY dry seasons, like the one we have lately experienced, naturally suggest the subject of irrigation, and some persons have come to feel that although this may not be a necessity among the hills of the north-east as it is in the plains of the west, nevertheless some method of artificial watering would often pay in the middle and New England states. Mr. J. H. Hale has asserted that the time will come when the streams of New England will be of more value to agriculture than they ever have been to manufacturing, and in the late number of the *Hartford Courant* he describes a project for using a little brook that runs among the hills in a distant part of his farm to help out his crops in time of drought, as follows:

The main features of the plan are a small reservoir up among the hills, which forms a sort of pocket for a lively brook which has never been known to go dry, and a line of pipe of a little over 5,000 feet, practically a mile, with a fall of 107 feet from the reservoir to the house. Instead of carrying the main by the shortest and most direct route, as soon as the grade will permit it is turned off and follows along the ridges of the farm, which form a sort of backbone all the way down to the street. About every two hundred feet along this line hydrants are being put in, and from these water can readily be carried on the surface of the ground in two or three directions in every instance, and it is believed that there is sufficient water to thoroughly irrigate from twenty-five to thirty acres of land by surface irrigation in this way, the contour of the land and the character of the soil being such that water can be run down between the rows of plants and trees, so as to give a very even and satisfactory distribution. An enterprise of this kind, of course, is quite an expense for a single farm, but through neighborhood coöperation a very much larger pipe could have been put down in the same ditch, and by building a heavier dam and a greater storage reservoir there is no reason why just such a little stream as this might not be made to irrigate a half-dozen or more farms in its immediate vicinity.

### Grapes under Glass.

AS a general rule, the black varieties of grapes are preferable to the white ones for growing indoors and especially for market, where they usually bring the top price. Nevertheless, no black grape has yet been introduced which excels the White Muscat of Alexandria in flavor and general good qualities as a table grape. But, assuming that the same price could be obtained for such varieties as Black Hamburg, it would not pay the market grower to grow Muscat of Alexandria, as it is a much harder grape to handle, being shy both of setting and stoning, and is never such a certain cropper. It requires, too, a higher temperature all through to bring it to perfection. We often see these two above-named varieties grown together in an early house, where the black does fairly well, but for early work, if a white grape is really desired, I should prefer to substitute Buckland Sweetwater, as it ripens from two to three weeks earlier than the Muscat, and this means a great deal at the beginning of the season. Although the Buckland Sweetwater is a very good grape, it does not possess the high qualities of the other, and in substituting it we sacrifice several points in quality for the sake of earliness. For the second house we should commend Black Hamburg for market, but for private use we would add a few rods each of Muscat Hamburg and Mandersfield Court for black, and Muscat of Alexandria for white. Mandersfield Court is an excellent grape, but it bursts badly, a trouble which can be prevented either by girdling with a stout string or cutting the shoot half through a little below the bunch. This bursting takes place when the berries are nearing ripeness, and when the first signs of it are observed some means must at once be taken to check the flow

of sap. This a good keeping variety, and may also be used, if desired, in a late house, but for late work, either for market or home use, it is hard to find two better grapes than Barbarossa and Gros Colman. For keeping qualities, Lady Downes is probably the best late grape; it is also an excellent table grape, but both bunch and berry are small compared with the two foregoing varieties.

Tarrytown, N. Y. *William Scott.*

## Notes from the Missouri Botanical Garden.

ON a two-year-old seedling stock of Robinia Pseudacacia from the nursery a cion of R. hispida was cleft-grafted two years ago, and it now shows four strong, sturdy branches, each four feet in length. Last spring the profusion of large, deep rose-colored flowers made a splendid spectacle. We find R. Pseudacacia an excellent stock to work on, because it continues a gradual growth from spring until the fall, and then ripens up properly before winter. The only objection is that in exposed situations the growths are apt to be broken off during summer or fall by the wind. It would seem to be suitable for forcing as a greenhouse-plant, where staking would overcome this. It lasts in bloom from two to three weeks. Naturally early-blooming plants are sought for forcing, but while this is not quite as early as Deutzias or Syringas by from five to thirty days, according to season, still its delicacy of bloom, its foliage and possible ease of culture recommend the trial we intend to give it.

Fig. 68.—Philadelphus Falconeri.—See page 494.

The English horticultural journals, especially, have been recommending the planting of early spring-flowering bulbs in the lawn for years, but few persons here seem to adopt the idea. We have always found it a good plan, and these spring flowers are never more pleasing than when seen in the grass, among the shrubberies or along the fences. Eight or ten in a comparatively close group, here and there connected by others wider apart, and now and then several boldly showing themselves scattered still further apart and leaving the general group still further, is an effective way of planting. We attempt to avoid all regularity and give a perfectly natural appearance. When two kinds of bulbs are mixed together they frequently give a pleasing effect. Crocus and Hyacinths, Colchicums and Ixias, Narcissus and Arums, losing themselves in each other, are very charming, while Poet's Narcissus and Scilla campanulata are fit companions amid the tall grass at their season of bloom. Some of the spring bulbs and rhizomes we use for this purpose, in addition to the above, are Eranthis, Chionodoxa, Erythronium, Galanthus, Scilla and Claytonia. Our method of planting is to force a crowbar into the soil, fill in one-half or one inch of previously prepared soil of about the consistency of that under the grass, place on the bulb, fill in with the same soil and step on it to complete the operation. Where the ground is well drained, leaf-mold is sometimes used, but the stiff, almost impervious, clay that abounds hereabout forms a small water-trap in almost every such instance, and consequently discourages this idea. In more thoroughly drained or lighter soils half an inch of leaf-mold or sand below the bulb would hasten root-growth.

Protecting for winter is now the main operation out-of-doors. Nearly all herbaceous plants have a covering of from five to eighteen inches of pine-needles. This is omitted when we want to test the hardiness of any plant, and where large areas are taken up by one well-established and hardy species. But, even in the last instance, it does no harm, and often prevents plants from being lifted by the frosts, especially small and late-planted ones. October was exceptionally dry, so much so that the leaves of many shrubs and trees, instead of ripening and dropping as usual, shriveled and hung on to the last moment. A heavy rainfall two weeks ago and several warm and rainy days since have caused many buds to swell, and one Silver Maple is almost ready to burst into full bloom. This untimely forcing must exert a bad influence upon the plant and reduce its vitality. Where the weather becomes gradually and steadily colder, plants may be protected as soon as the average maximum temperature ranges between twenty-five and forty degrees, according to the individual subject. Covering too soon favors undue activity of the sap, and a sudden and very low drop in the temperature does the harm which a covering is used to prevent; its sole object being to insure a comparatively uniform temperature and avoid sudden changes from one extreme to the other, the proper time to apply it is when settled cold weather comes. Here at St. Louis, for instance, I have seen for several days at a time a summer temperature in January. Such weather, especially when preceded by a good heavy rain, tends to excite shallow-rooted plants into growth. Thus far it has not been advisable to protect Roses. Bedded-out bulbs have been mulched with an inch or two of decomposed horse-manure to encourage continuous root-action by preserving the warmth in the soil. In spring, after the bulbs are removed, this is dug in. In a few weeks, however, pine-needles serve as the real winter mulch. Last winter Genista Andreana died down to the snow-level where unprotected. Magnolia fœtida and Xanthoceras sorbifolia usually have their branches tied together, and are then wrapped in burlapping or straw, always lightly to permit the air to freely circulate through the branches, but still keeping them as dark as possible. Xanthoceras does well here without any protection, but occasionally the plants die off mysteriously, like many Japanese plants. The southern Magnolia is a shy bloomer out-of-doors here. When protected as above and allowing it to stand erect or bending down, and covered with Pine-needles, just as Grapes are sometimes protected, is the usual method of attending to this. If left unprotected during winter it drops its upper leaves under the warm spring sunshine.

St. Louis, Mo. *Emil Mische.*

## Spraying by Steam-power.

SINCE spraying against insect and fungous enemies of plants has come into practice, numerous devices have been used for applying liquid poisons to trees and plants, but not until recently has steam-power been tried to any extent. The hand and power pumps now in use answer fairly well for the orchard and garden, but the ravages of the Elm-leaf beetle make necessary the use of powerful pumps to spray the foliage of our giant Elms, for we must spray the Elms here at the north if we wish to preserve them. In the southern states, where the summer season is longer, defoliation, though enervating to the trees, does not kill them, because another

set of leaves is produced, while in this latitude (about forty-one degrees) trees do not come into leaf again, and complete defoliation for two seasons in succession kills them.

During July, in company with others, I visited the nurseries of Stephen Hoyt's Sons, at New Canaan, Connecticut, to inspect a steam-power spraying outfit, consisting of an ordinary steam engine of six-horse power and a double-acting force-pump, which, with a tank holding 250 gallons, are mounted on a platform wagon. Two lines of hose, each 100 feet long, and warranted to withstand a pressure of 200 pounds to the square inch, are attached to the pump.

A man among the branches of the tree draws up the hose with a stout cord, and fastens it to a limb, so that he is not obliged to support the weight of the hose filled with liquid. He is then in a position to direct the spray to all parts of the tree, two or three minutes at most being required to spray a large tree. The spray strikes the under surfaces of the leaves, where the insects usually feed. While two trees are being sprayed, men climb two adjacent trees, thus keeping the whole force well occupied.

There are many large old Elms on Mr. Hoyt's estate which have been sprayed for two seasons with this machinery; some with Paris green, others with "slug-shot," and all were in good leaf. Other trees close by which were not treated looked brown and dead, so complete was their defoliation. Mr. L. O. Howard finds arsenate of lead the best poison to use against the Elm-leaf beetle. By adding a little glucose to the solution it will adhere to the foliage for a long time. Though the pump and engine were not mounted upon a wagon at the time of our visit, Mr. Hoyt operated it for our benefit. Water was thrown in a perfect spray against the gable of a large barn between thirty and forty feet from the ground. Several different nozzles, including the Nixon, Vermorel, McGowen and graduated garden nozzle, were attached. Of these the McGowen was the most satisfactory in every particular.

The engine is used for many other purposes about the farm, such as cutting ensilage, sawing wood, threshing and other work where power is needed. During our visit we saw it utilized for unloading hay.

At present there seems to be an opening for a limited number of enterprising young men to take up spraying as a business. As it is, only the larger fruit-growers and gardeners can afford to equip themselves with elaborate and expensive machines, but there is a vastly greater class who would also spray if this could be done cheaply and in season. It would require but a small capital to procure an outfit for all kinds of work. But the man who takes up spraying as a business should possess a thorough knowledge of the use of insecticides and fungicides as well as an acquaintance with the life-histories of the insect and fungous enemies which he tries to combat. This information can easily be obtained from our agricultural colleges and experiment stations, and there is no reason why the spring and summer seasons, at least, might not be fully occupied in spraying trees and plants against the attacks of different insects and fungi.

Experiment Station, New Haven, Conn. *W. E. Britton.*

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**Dipladenia Boliviensis.**—The Dipladenias are not particularly free-flowering plants, but this species, although one of the smallest of the genus, flowers quite freely. It blooms when quite small, and it is rather a straggling shrub than a climber, and it makes graceful little plants when well cultivated. The leaves are leathery, shining green, oblong-acuminate, about three inches long. The flowers are produced in few-flowered terminal or axillar clusters, and measure three inches in length. The funnel-shaped five-lobed corolla is of the purest white, with a rich orange-yellow throat. Segments nearly trapeziform in outline, of a waxy texture. The flowers are produced sparingly throughout the summer and last long in perfection. This fine species will do well under ordinary greenhouse treatment in a rich fibrous soil and well-drained pots.

Newark, N. J. *N. J. R.*

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**Arbutus Unedo.**—The Strawberry Tree, as this plant is often called on account of the slight resemblance of the fruit to a strawberry, is a native of the shores of the Mediterranean and the west of Ireland. Its principal claim to the attention of the gardeners of this country is its time of flowering, which is from the end of November to the middle of January, when it makes a very gorgeous display of its almost pure white nodding panicles of flowers. There is a large plant of it in the conservatories at the Botanic Garden in this city, which is yearly covered with bloom, but, curiously enough, although it has been there over twenty years it has never been known to bear fruit. This is probably owing to the absence of insects at that time of the year. The fruit is quite as attractive as the flowers; the color is reddish yellow; size about an inch in diameter, covered with minute warty protuberances which give it a very fascinating appearance. A good-sized plant, grown in a tub, is quite an ornamental subject for outdoor decoration in summer, and few plants are found more useful for winter flowering in a cool greenhouse where there is abundance of head-room. Cuttings taken about this season root before spring in a cool house. The plants ought to be grown in soil containing a liberal quantity of peat and sand.

Botanic Garden, Washington, D. C. *G. W. O.*

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## Correspondence.

### Does Size Affect the Flavor and Color of Fruits?

To the Editor of Garden and Forest:

Sir,—It is generally believed by horticulturists that large size in fruits is attained at the expense of high color and fine flavor. Although this opinion is commonly accepted, it does not stand the test of philosophical reasoning or of a comparison of these merits in the various varieties of fruits. It is interesting to note that this opinion is probably the outcome of the theories of Goethe and St. Hilare, who maintained that every plant has a sum of activity, within which all variations must take place, and that a marked variation in one direction must be at the expense of some other part. It is now supposed that a plant can be made to vary progressively in all its parts, which means that vigor, size, fruitfulness, good color, etc., can be combined in the same individual.

It may be said further that a comparison of the quality and size of small varieties, with the same qualities in large varieties, cannot be made, because only those small varieties which have a special merit in their high color or fine flavor have been profitable to propagate, while hundreds of unprofitable small varieties have been thrown away. On the other hand, it may pay to propagate a large variety, because of its size, and consequently many such apples as the Ben Davis and Twenty Ounce are grown, though both are inferior in flavor.

A study of the fruit catalogue of the Michigan Horticultural Society for 1894-95 gives opportunity to show proof that large size may coexist with fine flavor. In this list the fruits are described according to size, color and form and their special value for dessert, cooking and market, each quality being marked on a scale of ten.

There are thirty-two dessert apples which rank nine and ten, five of which are large, four medium to large, fifteen medium, four medium to small, three small and one undescribed. Of the two apricots, one is large and one very large. Of the seven best blackberries, six are large and one medium. Of the twelve cherries, six are large, two very large and four small; and a similar uneven relation exists in the other varieties of fruits described. The figures, therefore, seem to show that large size and fine flavor are entirely unrelated; that size and color are unrelated, and that a large proportion of the large apples and other fruits ranked nine and ten for dessert are both high-colored and fine-flavored.

Cornell University. *G. Harold Powell.*

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### Notes from Brookline, Massachusetts.

To the Editor of Garden and Forest:

Sir,—During a recent visit to private gardens in Brookline, Massachusetts, I noticed in the fine collection of tropical plants belonging to Dr. C. G. Weld a beautiful specimen of the somewhat uncommon Pavetta Borbonica. This handsome plant has leaves opposite, lanceolate, dark glossy green, about one foot long, and dotted with spots of lighter green, and is useful for dinner-table decoration. It belongs to the Rubiaceæ, to which also belong the Ixora and the Cinchona, and is a native of the Isle of Bourbon. Dracæna Baptisti and D. magnifica are two handsome varieties of the bronzy leaved type, and are here represented by two well-grown specimens. There are also large specimens of Kentia Belmoreana, K. Fosteriana and K. australis. Curculigo recurvata, in the green and white variegated forms, is indispensable in any grouping of plants for effect. Broken into single crowns and potted into six-inch pots, it makes specimens of convenient size. It should be a valuable market plant when grown in this way. Its Palm-like growth and endurance of rough usage makes it valuable also as a house-plant. Its general appearance does not indicate its family relationship with the Amaryllids, but an examination of its six-parted yellow flowers and the position and structure of its seed capsule proves it. It is a native of the East Indies.

Among hard-wooded plants, otherwise known as Australian plants, there is here a grand specimen of Acacia Drummondii. Its long tassels of yellow flowers are borne in the axils of the palmately pinnate leaves near the ends of the branches. A. cultriformis, with knife-shaped phyllodia of glaucous hue, is represented by a large specimen which promises abundant bloom. The globular flowers are borne in bunches near the ends of the branches. In A. heterophylla the phyllodia are small and very dark green. This forms a handsome small bush, blooming quite freely for a foot or more along the stems.

The new hybrid Streptocarpuses are becoming common, and their gloxinia-like flowers in blue and white shades are effective in small vases with a little green. An uncommon Aroid, Nephthytis picturata, is worthy of note, the white variegation of the leaves taking the form of a Fern-like frond.

At Mr. J. T. Gardiner's there is a choice collection of Cypripediums. All the varieties of the C. insigne type now in bloom are especially good in markings. I was too early to see C. Sanderianum, which is about to bloom for the first time in this country. C. Chamberlainianum was shown at the spring show in Boston, and is still flowering on the same spike. Eight blooms have opened, and three more buds are to come. The dorsal sepal is very light green in color; the petals are narrow, twisted, purple, spotted with brown. A neat little plant of Asparagus deflexus shows a comparatively new decumbent habit, and is apparently well suited for pillar or rafter work. Cocos Weddelliana, one of the most beautiful small Palms, is seldom seen so well grown as here. The Australian plants, which were the late Mr. Atkinson's pride, look uncommonly well under the care of Mr. Thatcher, who was Mr. Atkinson's assistant here for several years. Genista Andreana has recently been added to the collection. This handsome brown and yellow flowered Broom, from Normandy, makes a most effective plant for grouping. The Heaths in flower at the time of my visit in November were Erica Cavendishii, yellow; E. Melanthera, small pink flowers with black anthers, and E. ventricosa, pink, and the type of the closed corolla group. The Cherokee Rose, in a cool house overhanging a Lily tank, seems perfectly at home and promises an enormous crop of bloom, as also does the Yellow Jessamine of the southern United States, Gelsemium sempervirens. The collection of Phalænopsis improves every year, and the plants are now the best to be seen anywhere. They include P. Schilleriana, P. amabile and P. Stuartii. They are grown at the warm end of a Cucumber-house, in moisture and heavy shade. The same conditions, with somewhat less shade, appear to suit a fine lot of Eucharis Amazonica, which promise to bloom well during the early spring months. In the cool Orchid-house, plants of Odontoglossum Alexandræ are bristling with flower-spikes, and a few are already in bloom.

Wellesley, Mass. *T. D. Hatfield.*

## Late-flowering Golden-rods.

To the Editor of GARDEN AND FOREST:

Sir,—I notice a reference to this subject on page 458. Here at Las Cruces, New Mexico, as late as November 15th, after some severe frosts, I was pleased to find Solidago Canadensis in flower, and got from it the last bees of the season, a male Halictus pectoraloides and a female Halictus ligatus.

Agricul. Expt. Station, Mesilla Park, N. M. *T. D. A. Cockerell.*

## Keeping Grapes through the Winter.

To the Editor of GARDEN AND FOREST:

Sir,—I have read the remarks in your issue of November 13th, regarding the keeping of grapes through the winter with great interest. The method you describe is hardly sufficient for our purposes without further precautions, on account of our warmer climate and the greater delicacy of most of our grapes. If kept in a dry place, with the precautions you mention, our grapes will keep till December or January, but by that time, if still sound, they become wilted and dried almost to raisins. In order, therefore, to keep them in a perfectly fresh state till spring or summer, they must be surrounded by a moist atmosphere; then the only difficulty to contend with is their liability to mold. The Agricultural Experiment Station of Berkeley is now experimenting on methods of preventing the development of molds without injury to the grapes. It is yet too soon to predict the results, but the indications are at present in favor of the use of alcoholic or sulphurous vapors. On the termination of the present series of experiments we hope to be able to give more definite results for the guidance of growers.

Viticultural Department, Berkeley, Calif. *F. T. Bioletti.*

## Recent Publications.

Sir Dietrich Brandis contributes to the *Journal of the Linnæan Society of London* a systematic account of the Dipterocarpaceæ, a family of tropical Asiatic trees and shrubs, which he groups in five tribes, sixteen genera and three hundred and twenty-five species, although, in view of the imperfect knowledge of the vegetation of the Philippine Islands, portions of Borneo, Siam and New Guinea, the author believes that it is not unreasonable to suppose that not more than one-half, or, perhaps, two-thirds, of the members of the family are known.

An interesting peculiarity of the trees of the order is that several of the species are gregarious, forming sometimes nearly pure forests of great area in which one species has overmastered all other trees. In the tropical forests of south-eastern Asia the trees of this family play the part which in this country belongs to Pines and Oaks, Spruces and Firs. The most remarkable of the gregarious species is, perhaps, the Sâl, Shorea robusta, the most valuable timber tree of northern India. This great tree forms pure, or nearly pure, forests at the foot of the Himalayas from the Punjab to Assam, and in a climate and soil which suit it no other tree can compete with it. This ascendancy Sir Dietrich ascribes to the fact that the seeds ripen at the commencement of the rainy season after the forest fires of the hot season have passed over the country. The seeds are produced in great abundance nearly every year, and germinate quickly. The leaves of the seedling plants are large, and are thus able to choke other seedlings which may spring up among them, and when the ground is burnt over by the jungle fires the following season the seedlings, or most of them, are strong enough to send up fresh shoots when the rains come. The young Sâl, moreover, supports shade and will live for years under the dense shade of grass, bushes or other trees.

Sir Dietrich points out as a remarkable fact that two natural orders of woody plants, Coniferæ and Dipterocarpaceæ, whose species often form pure forests, produce resinous substances on a large scale in the leaves and deposit them in the wood, a complicated system of resin ducts being found in all parts of Dipterocarpaceæ as well as in Coniferæ. In the living tissue these substances are found only in a liquid and oily condition, but in the old wood solid crystalline masses are deposited.

One of the most important of recent contributions to dendrological science, this paper will be read with interest by botanists and foresters.

*American Woods.* By Romeyn B. Hough, Lowville, New York.

Part VI. of this interesting series, like its predecessors, contains sections of twenty-five different species of trees, with the botanical characteristics of each and notes on their properties and uses. All the trees represented in this volume are natives of our Pacific coast, and some of the sections, like those of the Madroña, the California Buckeye and the Mesquite, are of exceptional interest and beauty. We have so often spoken of this work as its successive volumes were issued that it is hardly necessary to repeat now that each species is represented by three very thin sections taken at different planes, one of these being described approximately as transverse, another radial and the third tangential to one of the annual cylinders of growth, so that a fair idea is presented of the color and grain of both the heart and sap wood of a given tree as they appear when cut at different angles. These specimens and the accompanying text have a real educational value. The sections are so attractive in appearance that they make an appropriate holiday gift for any bright boy or girl, and they will prove a source of unfailing pleasure to both the old and the young.

## Notes.

Several trustworthy newspapers in this country and in England having announced the untimely death of Mr. George M. Dawson, a brief obituary note, based on this report, appeared in our last issue. We are more than pleased to learn that Mr. Dawson is still living, with the prospect of many useful and happy years before him.

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Pierre Notting, one of the most successful of the French Rose growers and the originator of many of the best modern hybrid Perpetual Roses, died on the 2d of November, in his seventieth year.

*Nature's Fashions in Lady's-slippers* is a trim little book in stiff paper covers, published by Bradlee Whidden, of Boston, which contains six reproductions from photographs of our native Cypripediums, with a neatly printed page of text to accompany each picture.

Experiments have been made during ten years past with the different varieties of Dwarf Juneberries at the Iowa Experiment Station, and four of them which have borne the largest crops of the best fruit are now being sent out for trial. In size and quality these berries are said to compare favorably with large-bush huckleberries.

Very rarely does the flowering Dogwood develop such an abundance of fruit as it has this year in the neighborhood of this city. In Central Park, and more especially in the wildwoods in the upper end of Manhattan Island, where these trees are abundant, the bright scarlet berries—three or four of them together at the extremity of every branchlet—make them the most conspicuous feature in the foreground of every landscape.

We have heretofore spoken of the dwarf Sweet Pea, Cupid, which Mr. Burpee, of Philadelphia, has put on the market. It now appears that a Sweet Pea of similar character has originated in Germany and another in England. None of these plants have any tendency to climb. That similar sports should appear at the same time in different places is not uncommon. Indeed, this coincidence has been noticed so often that one is inclined to believe that it is in obedience to some natural law. It is only a few years ago that at least three non-climbing varieties of Lima Beans originated in different parts of this country at about the same time.

An interesting bulletin on Forestry has just been issued by Professor L. C. Corbett, of the South Dakota Experiment Station. Among the valuable trees not injured in that region by late spring frosts are noted the Wild Black Cherry, White Birch and White Elm, while the species most injured by frost are the European Larch, Black Walnut and Ash. The Wild Cherry is one of the most promising species on the station grounds, and only two trees are more highly recommended for general planting, namely, the White Elm and the Green Ash. Among conifers, Scotch Pine, Red Cedar and White Spruce are recommended in the order named.

Bulletin No. 94 from the New York Agricultural Experiment Station is really a little treatise on the feeding of plants, or, in other words, on the elements of agriculture. It contains 130 pages, and although it is scientific in the best sense of the word it is simple enough to be comprehended by any intelligent farmer. It is not a pamphlet to be hastily glanced over and thrown away, but one to be studied by all who want to know something of the constitution of plants, the chemistry of their foods, the practical way of preparing fertilizers for them, how to make the most of the materials on hand, and how to buy most cheaply the plant-food which cannot be had at home. The book contains many tables of permanent value and a first-rate index, which largely increases its usefulness as a book of reference.

The proportion of the apple supply exported is large enough to cause a scarcity of highest grades for home use, and choice King, Wine Sap and York Imperial now cost the retail buyer $4 50 a barrel. During last week 22,378 barrels of apples were sent abroad from this port, while the receipts for domestic use comprised 38,596 barrels. Seedling and Navel oranges are now here from California, and moderate quantities of Florida oranges and grape-fruit from sections of the state which escaped the heavy freezes of last year. As much as $7.00 a box is paid for Florida oranges by wholesale dealers, three times the price of a year ago. Muscat and Emperor grapes still come from California, the latter almost as brightly colored as Flame Tokays, which are now past. Persimmons, strawberries and tomatoes are also coming from the western coast.

The forests of eastern Asia are rich in Lindera, the genus to which the Spice-bush of our northern swamps belongs, and one of the species, L. sericea, is used for making toothpicks, which are acceptable on account of the toughness of the wood and their aromatic fragrance. According to the *Chemist and Druggist*, an English paper, a new perfume, Kuromoji, which is attaining some popularity among manufacturing perfumers, is the essential oil of this plant. It seems that the oil is not produced on a large scale by dealers, but by the small farmers of Japan, each of whom distills the yields of the shrubs growing on his own estate. These stocks are bought by dealers at various centres and mixed together, and therefore there is no uniformity in the aromatic qualities of the product. L. sericea is a small slender shrub, four or five feet high, and the oil is derived from the young shoots and leaves, and its balsamic odor is useful in perfuming soaps and other articles. It was introduced into Europe as long ago as 1889.

Of dried fruits California apricots alone are in light supply, but, notwithstanding there is almost no foreign competition this year, prices have been unusually low, owing to excessive shipments to points throughout this country and for export. Wholesale dealers in this city are now offering evaporated apples of fancy grades at seven and a quarter cents, sun-dried eastern peaches at seven cents, cherries at ten cents, blackberries at four cents, huckleberries at six and a quarter cents, and raspberries at twenty cents a pound. Prunes sell for four to seven and three-quarter cents a pound, according to size, and apricots command thirteen and a half cents. Unpared California peaches bring eight and a half cents, the pared product being worth sixteen cents a pound. Since September 1st, 462,724 packages of dried fruits have been shipped to this market, 121,086 more than during the same period last year, and 168,426 packages have been exported, an increase of 90,391 packages over a year ago.

It is well known that the most delicate portion of an artichoke is what is called the "bottom," or, botanically, the receptacle from which the bracts spring. This receptacle in most artichokes is comparatively small and mixed up with the so-called "choke," by which name the pappus of the innermost florets is designated. In some varieties this receptacle, the fond d'artichaut, is thicker, more fleshy, and therefore more toothsome than in the ordinary sorts, showing that it has been developed at the expense of the succulent matter in the scales. In *The Gardeners' Chronicle* for November 30th is a portrait of the Laon Artichoke, which shows a much larger receptacle and thinner scales than those we are accustomed to grow here. The writer of the text which accompanies this illustration speaks of a visit to the trial-grounds of Monsieur de Vilmorin, at Verrières, where this variety was growing among many others. The foliage is said to be distinct and handsome, with the bracts comparatively less succulent than in the ordinary varieties. It is cultivated to some extent in England as the Large Green Paris Artichoke. We have observed much difference in this vegetable as grown in this country, but we have never seen a head in which the receptacle was developed to such an extent as this illustration shows. Monsieur de Vilmorin states that this variety is not as early as others, but is the best for general purposes. It comes true from seed, but is best grown from offshoots. We should be glad to hear from any one who has grown the true Laon Artichoke in this country.

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Robert Brown, who affixed to his name when writing upon botanical subjects Campsteriensis, to distinguish him from the other Robert Brown, died in London in October. He was born in Caithness, Scotland, in 1842, and received the degree of Doctor of Science from the University of Rostock, with a thesis on the North American species of Thuya and Libocedrus. From 1861 to 1866 Dr. Brown traveled in America from Venezuela and the West Indies to Alaska, visiting at this time the then little-known interior regions of Vancouver's Island and southern Oregon. As one of the results of this journey he published in the *Transactions of the Botanical Society of Edinburgh* a paper on some new and little-known species of Oaks from north-western America, which he had collected in Oregon; among them was the very distinct Quercus Sadleriana, which he first described in this paper, although it had been discovered by Jeffrey some years earlier. After his return to Europe, Dr. Brown became a lecturer on geology in Scotland, and then moved to London, where he produced a number of popular works of science. He is chiefly interesting to Americans as the author of the two papers we have already referred to, and of an incomplete work on the forests of North America, entitled *Horæ Sylvanæ*.